QUIZ 7 - MATH 112 YOUR NAME:

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. The fraction of the wind's energy that can be extracted by a turbine is

$$f(x) = \frac{1}{2}x(2-x)^2,$$

where x is the fraction by which the wind is slowed in passing through the turbine. Find the fraction x that maximizes the energy extracted.

2. A long gutter is to be made from a 12-inch-wide strip of metal by folding up the edges. How much of each edge should be folded up in order to maximize the capacity (i.e., the cross section area) of the gutter?



3. George's Luxury Rent[®] finds that it can rent 20 Ferraris if it charges \$10,000 for each for the weekend. It estimates that for each \$500 increase in price it will rent two fewer Ferraris. Let x be the number of \$500 increases.



(a) Find equations for the price p(x) charged and the quantity q(x) rented.

- (b) Find an equation for the revenue R(x).
- (c) Find the price and the quantity that maximize the company's revenue.